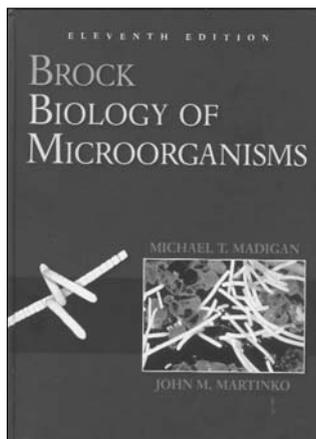


BOOK REVIEWS

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Brock Biology of Microorganisms, 11th edn

MICHAEL T. MADIGAN,
JOHN M. MARTINKO (EDS)

2006. Prentice Hall,
Upper Saddle River, NJ, USA
992 pp, 22 × 28 cm
Price: US\$ 140.00
ISBN 0-13-144329-1

Microbiology has experienced a transformation during the last 30 years that has altered microbiologists' view of microorganisms and how to study them. The history of *Brock Biology of Microorganisms* goes back more than 35 years. As a tribute to Thomas Brock, its original author, the book incorporated his name into the title after the 8th edition. Immediately following publication of the first edition of *Biology of microorganisms*, in 1970, Professor Ricardo Guerrero translated the book into Spanish (the first Spanish edition appeared in 1972, published by Ed. Omega, Barcelona). After the success of the first edition, the second one appeared in 1974 (and was followed also by the second translation of R. Guerrero [Omega, 1978]). The continuing success of this textbook is reflected in the new editions published every 3–5 years, in English and in Spanish [see the review on *Brock Biología de los Microorganismos* 10 edn. Int. Microbiol 7:77-78, published by Prentice-Hall, Madrid, in 2004]. Each edition has preserved the mission of the original volume: to review the principles of microbiology while informing readers of the latest discoveries in the microbial sciences.

Technological advances and broad knowledge of the microbial world have brought about significant advances in microbiology, and in biology in general. Microbes are the ancestors of all the complex and varied biological forms that now exist on Earth. All eukaryotic cells emerged from and have retained intimate connections with microorganisms, upon which they remain highly dependent. In order to understand the evolution of species of organisms that exist today, at the tips of the branches of the tree of life, it is necessary to study how they are related to their ancestors and what those ancestors might have been like. Readers of *Brock Biology of Microorganisms* will become familiar with the world of

microorganisms, what they are, and what they do. The book makes use of valuable pedagogical tools, such as a working glossary, sidebars (providing “fun reads” related to the chapter's central theme), a concept check, and study questions to reinforce the topics discussed in each chapter. The 11th edition introduces a new visual presentation. The tables and figures have been completely redesigned to make the information easier to understand, and they are better organized. An art photograph opens each chapter, and each chapter is color-coded at the upper right corner, which allows the reader to quickly refer to individual chapters. Several supplements (e.g. tutorials) include a link to a planned website [www.prenhall.com/madigan].

Brock Biology of Microorganisms is organized into 31 chapters comprising six units. Unit I, *Principles of microbiology*, is designed to provide the student with a basic background in microbiology, including historical perspectives, microbial structure and morphology, structure and function of prokaryotic and eukaryotic cells, growth and nutritional requirements of microbes, and essential and current topics of microbial genetics and molecular biology. Unit II, *Evolutionary microbiology and microbial diversity*, focuses on microbial evolution and how the phylogenetic picture of prokaryotes corresponds to their taxonomy and classification. The unit starts with a general overview of the prebiotic chemistry that could have supplied the necessary prerequisites for the origin of life, the earliest living forms, and the evolution to the eukaryotic cell. This section is recommended not only for students of microbiology, but also for anybody generally interested in biology.

A complete updating of the classification system reflects the recent edition of *Bergey's manual of systematic bacteriology*. In addition, Proteobacteria (a *Bacteria* phylum), which represents the majority of known gram-negative bacteria of medical, industrial, and agricultural significance, are discussed in the text in groups based on morphological or metabolic (ecological) criteria, e.g. nitrifying bacteria: *Nitrosomonas* (β -Proteobacteria) and *Nitrobacter* (α -Proteobacteria). This method of organization provides a better understanding of this phylum, but there is also a table that lists all of the major genera of Proteobacteria and their classification according to subdivision (α -, β -, γ -, δ -, ϵ -Proteobacteria). One of the best examples of updating advances in microbiology is the introduction of a new phylum, Nanoarchaeota, in the Domain *Archaea*. Although much attention is devoted to prokaryotes (*Bacteria* and *Archaea*), eukaryotic microorganisms such as fungi, algae and protozoa receive more coverage than is usual in general microbiology textbooks.

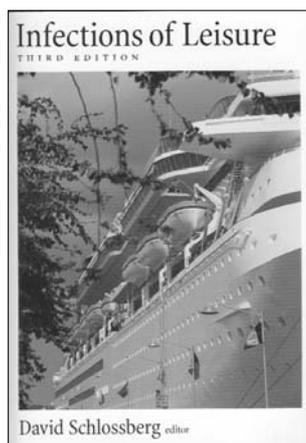
Unit III, *Metabolic diversity and microbial ecology*, is an excellent overview of current microbial ecology, which offers a very useful approach to understanding the inherent unity in the apparent diversity of life. Microbial ecology deals with natural processes as well as with interactions between microorganisms, and between microorganisms and other species and the environment. As microbiologists have increasingly come to appreciate that microbes in nature tend to live in communities, microbial ecology has provided a framework for extending the study of microorganisms from the laboratory to where they are found in nature (Chap. 18). Such studies have reinforced the view that, in prokaryotes, diversity is expressed in terms of metabolism rather than structure, as evidenced by the ability of microbes to utilize a wide range of energy sources and electron acceptors, an aspect that is strongly emphasized in *Brock Biology of Microorganisms*.

Humans have an intimate relationship with microorganisms. On the one hand, a small notorious set of bacteria, fungi, parasites, protozoa, and viruses cause disease, as discussed in the two units of the book dedicated to medical microbiology. Unit IV, *Immunology, pathogenicity, and host responses*, describes microbial growth control, nonspecific resistance, and the immune response to microbes. Unit V, *Microbial diseases*, focuses on microbial infectious diseases, which are grouped within each chapter according to their mode of transmission. On the other hand, bacteria have an overwhelmingly beneficial impact on the environment and are providing new tools to solve problems that confront modern human societies—such as neutralizing toxic waste-products by the process of bioremediation. Unit VI, *Microorganisms as tools for industry and research*, describes applications of microbial activities to improving food and industrial production.

The book not only contains fundamental knowledge essential to an introductory course on general microbiology, but also includes information for students seeking to expand or update their knowledge of the current state of microbiology. Although, fortunately, we have several very good textbooks on microbiology at our disposal, *Brock Biology of Microorganisms* remains, simply and undoubtedly, the best of them.

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Infections of leisure, 3rd edn

DAVID SCHLOSSBERG (ED)

2004. ASM Press,
Washington DC, USA
444 pp, 18 × 25.5 cm
Price: US\$ 59.95
ISBN 1-55581-299-6

Infections of leisure discusses the risks of infection associated with a wide range of leisure activities, such as camping, traveling, contact with house pets and other animals, including people, engaging in sports, body piercing, and tattoos. The relevance of this subject arises from the need for information on the possible medical consequences resulting from those activities in which thriving modern human societies invest an enormous amount of time, i.e. leisure activities. The book is well-organized and written in a very readable way; however, it assumes that the reader has a basic knowledge of microbiology and is thus aimed at inquisitive scientists, especially microbiologists, rather than the general public. Nonetheless, its wealth of information makes the book a good resource for learning about the nature and treatment of infections of leisure. Although physicians will also benefit from this book, it does not replace the need for a good medical reference book.

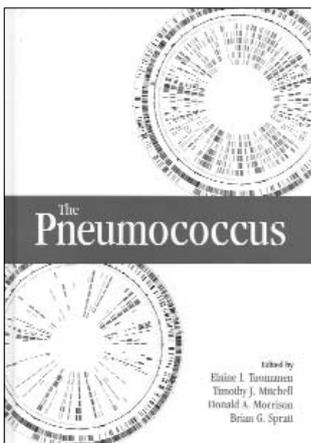
Each of the 16 chapters addresses a specific topic and is written by an expert (or experts) in that field. Chapters 1–4 discuss potential infections in recreational places such as the seaside, freshwater (including lakes and hot tubs), the countryside, and the garden. The first chapter (*At the shore*) describes poisoning by eating contaminated fish, vertebrate and invertebrate envenomizations, and other infections that may occur at marine locations. Zoonotic infections are discussed in Chaps. 5 (dogs); 6 (cats); 7 (birds); 8 (less common house pets, including rabbits, rodents, hedgehogs, reptiles, amphibians, ornamental fish, ferrets, and primates); and 9 (rats). Rabies is covered in detail in Chap. 10 (*Rabies: ancient malady, new twists*). Food-related infections are covered in Chap. 11, *Exotic and trendy cuisine*, while Chap. 12 discusses infections that may arise by partaking in sports activities. Chapter 13 (*Traveling abroad*) is highly recommended reading, before and while traveling, and is complemented by Chap. 14 (*From boudoir to bordello: sexually transmitted diseases and travel*) because, as noted in the

book, travel is often associated with sexual activity and some travel occurs specifically for sexual purposes. Two chapters, *Infections from body piercing and tattoos* and *Infectious diseases at high altitude*, are new in this third edition. Each chapter ends with an extensive reading list consisting of selected research and review papers.

Infections of leisure is a good compilation of the currently available data on infectious diseases related to leisure-time activities. In addition to classical bacterial infections, protozoan, helminthic and viral diseases, as well as poisonings and arthropods as vectors for human diseases are discussed. Recommendations concerning the control and treatment of these diseases are provided, but topics such as virulence factors, pathogenesis, and taxonomic classification are beyond the scope of the book. It should also be mentioned that, since *Infections of leisure* is meant to serve as a reference book, diagrams, tables, and photographs more appropriate for textbooks are not provided. Epidemiologists may also take issue with the fact that the book's coverage of epidemiological aspects relies almost exclusively on cases from the United States. In addition, some readers may find the tone of the book moralistic, as it can be interpreted as conveying the idea that amusement and leisure pose risks to human health. Microbes, however, are widespread, and human-microbe interactions are unavoidable—for the good or for the bad—in every facet of human life, not only those related to leisure.

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The Pneumococcus

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and TIMOTHY J. MITCHELL,
DONALD A. MORRISON,
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2004. ASM Press,
Washington DC, USA
466 pp, 18 × 26 cm
Price: US\$ 115.95
ISBN 1-55581-297-X

In the introduction to her book, Elaine I. Tuomanen writes “The pneumococcus has pushed biological science to the discovery of DNA, of polysaccharide-based vaccines, of quorum

sensing, of peptide-based bacterial communication, and many other basic tenets.” She also calls *Streptococcus pneumoniae* the “quintessential gram-positive pathogen”, an opinion that no doubt is shared by the many researchers whose studies have focused on the mechanisms developed by bacteria to cause disease. The history of pneumococcus is indeed linked to that of the discovery of DNA, being the transforming principle defined by Oswald Avery (1877-1955), Colin McLeod (1909-1972), and Maclyn McCarty (1911-2005) in 1944, which marked the beginning of the molecular biology era. The different pneumococcal types, distinguished by the particular capsular polysaccharides that they produce, have forced researchers to abandon the construction of pneumococcus-targeted vaccines based on killed whole cells, as these were of very limited effect. Instead, a more rational scientific approach to vaccine design has been adopted, exemplified by polyvalent capsular polysaccharide vaccines and, more recently, polysaccharide-protein conjugated ones.

Pneumococcal cells may be found in the human respiratory tract, where they produce an asymptomatic carrier state, but, under the proper circumstances, they easily become responsible for colonizing diseases, such as otitis, conjunctivitis, and pneumonia. Furthermore, they can invade the blood stream and internal tissues, causing bacteremia, and meningitis. The extraordinary plasticity of the bacterium's genome allows it to escape the immune system as well as most anti-bacterial therapies. Thus, any discussion of *S. pneumoniae* must include its capability for adaptation and evolution, as evidenced by the fact that the development of a new vaccine or antibacterial compound is inevitably followed by medical reports of changes in pneumococcal populations. Such changes have resulted in the world-wide prevalence of resistant and multiresistant clones, highlighting the fact that, despite the vertiginous advances in our knowledge of the biology of streptococcus, its multiple mechanisms of disease remain to be elucidated. Surprisingly few books have been written about *S. pneumoniae*. The precedent to the book under review was *Streptococcus pneumoniae, Molecular Biology & Mechanisms of Disease*, published 4 years ago by Alexander Tomasz (ed.), and was the result of a workshop on pneumococcal biology held in Portugal in 1996. Tomasz's book was a complete compilation of all topics that researchers in the field were exploring at the time, with special emphasis on the biological and physiological aspects of pneumococcus and pneumococcal disease. In the meantime, the revolutionary achievement of several complete genome sequences of pneumococcal isolates has served as the culture broth for more global approaches to the many questions that remain unsolved, leading to publication of *The Pneumococcus*. The editors of this book aim to “emphasize both the

details of the bacterium and all it can do as well as the host response and mechanisms of disease". The contributions of the different authors are divided into four sections: "The bacteria" (genome, surface anatomy, and microbial physiology), "Host-microbe interactions" (evolution, epidemiology and mechanisms of carriage), "Invasion and infection" (exposure and colonization, and invasion and infection), and "Treatment and prevention" (ecology, therapeutic strategies, antibiotic resistance, immune responses, and vaccines). The editors have tried to balance each of these sections, which results in an almost equitable division of the book. Nonetheless, this attempt was less than successful, since some chapters seem to belong to other sections, and the number of pages devoted to medical reports has limited the emphasis placed on discussing physiological concepts, such that much more attention is paid to clinical aspects than to the biology of the bacterium.

While some chapters of the book are dispensable, as they contribute very little to the broader aims of the book, those covering the path from microbe to infection and its treatment

are highly recommended. A group of experts have revisited their subjects, providing, in most of the cases, a vast clear view for neophyte eyes as well as reviews on topics never before well-reported. However, the editor's work could have been much more exhaustive, as a deeper reading reveals a degree of overlap between some of the chapters. While, to some extent, this is inevitable, there are many noticeable inconsistencies in the data provided by different authors. Readers will therefore find it almost impossible to obtain definitive information on several subjects, unless they spend a considerable amount of time examining the original papers. For this reason, despite its many positive aspects, the book does not offer a reliable orientation to its subject.

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